UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

FEB 0 3 2014

OFFICE OF THE
REGIONAL ADMINISTRATOR

The Honorable Roy Blunt
United States Senate
Washington, DC 20510

Dear Senator Blunt:

Thank you for the opportunity on January 23, 2014, for the U.S. Environmental Protection Agency, Region 7 to update you and your staff on our ongoing work at the Westlake Landfill Superfund site. It was helpful to have representatives from the Missouri Department of Natural Resources participate and be able to address concerns with the subsurface smoldering event at the Bridgeton Landfill as well as having present, the operator of the site, Republic Services.

During the course of the meeting you made several requests for follow-up information on specific subjects. The follow-up information consists of; Table ES-1, that was developed by Republic Services, and contains information found in the complete Supplemental Feasibility Study; Table 10 is taken directly from the EPA approved Supplemental Feasibility Study developed by Republic Services under Agency oversight, and compares remedial action alternatives to the nine criteria the EPA follows in evaluating potential remedies. Also enclosed is a map provided to us by MDNR titled "Public Water System Well: MCL Violations for Combined Radium 226 and Radium 228." The locations depicted on the map indicate MCL exceedences caused by naturally occurring Radium in bedrock wells. Your office may have received this information directly from MDNR. Also, enclosed is a copy of a letter to Sen. Christopher Bond regarding the Earth City Levee.

Additionally, you requested that we provide you with information the EPA is developing, to provide insight on a question that has been raised by some concerned interest groups: "What would happen if the subsurface smoldering event in the Bridgeton Landfill were to come in contact with the radiological impacted material at the Westlake site?" That question is currently being evaluated by landfill experts in the EPA's Office of Research and Development, along with information provided to the EPA by Republic Services. Since the SSE is occurring in a landfill under MDNR authority, we continue to cooperate with them on developing a response to that question. We anticipate the EPA will have completed that evaluation near the end of March 2014. Once that work is completed, we will provide your office with a copy.

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We appreciate Kerry DeGregorio's and Downey Palmer's regular participation on the frequent conference calls EPA Region 7 conducts to update elected officials. We will continue to keep your office informed of EPA activities at the Westlake Landfill and our coordinated efforts with MDNR to implement the contingency plans ordered by the State Attorney General to construct an isolation barrier between the SSE in the Bridgeton Landfill and the Westlake Landfill site.

If we can be of any further assistance, please feel free to contact me at 913-551-7006, or your staff may call LaTonya Sanders, Congressional Liaison, at 913-551-7555.

Sincerely,

Karl Brooks

Enclosures

Table ES-1 SUMMARY OF POTENTIAL RISKS, IMPLEMENTATION SCHEDULES AND COSTS WEST LAKE LANDFILL SFS REMEDIAL ALTERNATIVES			
	ROD-Selected Remedy	**"Complete Rad Removal" with Off-site Disposal**	**"Complete Rad Removal" with On-Site Disposal**
Long term residual cancer risk 1,000 years after cleanup	1.3×10^{-6} (1.3 extra incidences in 1,000,000 people)	$<1 \times 10^{-7}$ (less than 0.1 extra incidence in 1,000,000 people)	1.5×10^{-6} (1.5 extra incidences in 1,000,000 people)
Short term risks during cleanup	<u>On-Site Workers</u> Industrial accidents: 4.7 Cancer risk: 7.2×10^{-5} (0.72 extra incidences in 10,000 people) Worker dose: 50 mrem/yr	<u>On-Site Workers</u> Industrial accidents: 7.6 Cancer risks: 7.6×10^{-4} (7.6 extra incidences in 10,000 people) Worker dose: 260 mrem/yr	<u>On-Site Workers</u> Industrial accidents: 9.0 Cancer risks: 7.4×10^{-4} (7.4 extra incidences in 10,000 people) Worker dose: 260 mrem/yr
	<u>Community</u> Transportation accidents: 0.61 Cancer risk: 3.3×10^{-6} (0.33 extra incidences in 100,000 people) Carbon dioxide emissions: 8,350 tons	<u>Community</u> Transportation accidents: 1.4 Cancer risks: 2.1×10^{-5} (2.1 extra incidences in 100,000 people) Carbon dioxide emissions: 35,400 tons	<u>Community</u> Transportation accidents: 0.79 Cancer risks: 2.0×10^{-5} (2.0 extra incidences in 100,000 people) Carbon dioxide emissions: 17,900 tons
Schedule to reach cleanup goals	3 years (or 5 years at spend rate of $10M per year)	4 years (or 29 years at spend rate of $10M per year)	6 years (or 13 years at spend rate of $10M per year)
Costs	Capital construction: $41,400,000 OM&M per year: $42,000 to $414,000	Capital construction: $259,000,000 to $415,000,000 OM&M per year: $40,000 to $412,000	Capital construction: $117,000,000 OM&M per year: $52,000 to $604,000

(Source: Executive Summary of the Supplemental Feasibility Study, Radiological-Impacted Material Excavation Alternatives Analysis, West Lake Landfill Operable Unit-1, December 28, 2011, prepared on behalf of the West Lake Landfill OU-1 Respondents by Engineering Management Support, Inc.)

Table 10: Comparative Analysis of Alternatives

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Threshold Criteria			
Overall Protection of Human Health and the Environment	All of the alternatives would be protective of human health and the environment. All alternatives eliminate or reduce potential exposures to (1) external gamma radiation, (2) radon emissions, (3) inhalation or ingestion of contaminated soil or wastes, (4) dermal contact with contaminated soil or waste, and (5) dispersal of contaminants in fugitive dust. All of the alternatives would reduce potential infiltration of precipitation into the waste and thereby reduce the potential for leaching to groundwater. All alternatives include institutional controls to ensure that only land and resource uses that are consistent with the remedy and protective of human health and the environment are allowed in the future.		
Compliance with ARARs			
Compliance with Chemical-Specific ARARs	All of the alternatives would comply with chemical-specific ARARs including (1) uranium mill tailing standards for radon emissions, maximum concentrations for groundwater protection, and cleanup of contaminated land (Buffer Zone and Crossroad Property), (2) radon NESHAP, (3) Missouri radiation protection standards, and (4) Missouri maximum contaminant levels (MCLs).		
Compliance with Location-Specific ARARs	Would meet location-specific ARARs including solid waste regulation standards relative to 100-year floodplain and proximity to airport runways.	Would meet location-specific ARARs including solid waste regulation standards relative to 100-year floodplain and proximity to airport runways.	Would meet location-specific ARARs including solid waste regulation site selection standards relative to airport runways, 100-year floodplain, wetlands, seismic zones, and unstable ground. May not meet all FAA requirements (TBCs) relative to airport runways because location of on-site cell is within 8,000 feet of end of westernmost runway at Lambert-St. Louis International Airport.
Compliance with Action-Specific ARARs	Would meet action-specific ARARs including Missouri solid waste regulations closure and post-closure standards and uranium mill tailing standards for longevity of disposal facilities.	Would meet action-specific ARARs including Missouri solid waste regulation closure and post-closure standards, DOT and NRC standards for shipment of radioactive wastes, and disposal facility waste acceptance criteria.	Would meet action-specific ARARs including Missouri solid waste regulations for design, operation, closure and post-closure of a solid waste landfill and uranium mill tailing standards for longevity of disposal facilities. Would NOT comply with Missouri solid waste prohibition on disposal of radioactive contaminated material in solid waste disposal cell.

Table 10: Comparative Analysis of Alternatives (continued)

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria			
Long-Term Effectiveness and Permanence			
Magnitude of residual risks	Highest long-term risk that would remain upon completion of the remedial action (1.3×10^{-6}) is within EPA's target risk range of 1×10^{-6} to 1×10^{-4}.	Highest long-term risk that would remain upon completion of the remedial action ($<1 \times 10^{-7}$) is less than EPA's target risk range of 1×10^{-6} to 1×10^{-4}.	Highest long-term risk that would remain upon completion of the remedial action (1.5×10^{-6}) is within EPA's target risk range of 1×10^{-6} to 1×10^{-4}.
Adequacy and reliability of controls	Engineering measures including construction, inspection and maintenance of a final cover would be the primary methods used to control waste materials that remain on site. These types of measures have been demonstrated to be effective at numerous solid waste and NCP sites. Conceptual design of the new landfill covers is based on established designs for solid waste disposal sites, augmented to limit increased gamma radiation and radon emissions expected to occur over a 1,000 period from decay of thorium. Includes rip-rap armor along toe of Area 2 to provide protection against flooding in the unlikely event of failure of the Earth City Flood Control levees or stormwater management systems. Engineering measures would be augmented and supported by existing and additional institutional controls which also have been used at numerous solid waste and NCP sites.	Includes excavation and removal of radiologically-impacted materials above levels which would allow for unrestricted use relative to radiological contamination to an off-site disposal site, and thus is potentially more reliable than the other alternatives. Engineering measures including construction, inspection and maintenance of a final cover would be the primary methods used to control waste materials that remain on site. These types of measures have been demonstrated to be effective at numerous solid waste and NCP sites. Engineering measures would be augmented and supported by existing and additional institutional controls which also have been used at numerous solid waste and NCP sites.	Engineering measures including construction and closure of a new engineered waste disposal cell and construction, inspection and maintenance of a final cover would be the primary methods used to control waste materials that remain on site. These types of measures have been demonstrated to be effective at numerous solid waste and NCP sites. Engineering measures would be augmented and supported by existing and additional institutional controls which also have been used at numerous solid waste and NCP sites. Conceptual design of the new landfill cell is based on established designs for solid waste disposal sites, augmented to limit increased gamma radiation and radon emissions expected to occur over a 1,000 period from decay of thorium.

Table 10: Comparative Analysis of Alternatives (continued)

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria (cont.)			
Reduction of Toxicity, Mobility or Volume through Treatment	None of the alternatives include treatment technologies that would reduce the toxicity, mobility or volume of waste material through treatment as a primary component. Treatment technologies are generally not applicable to the site wastes due to the nature and overall large volume of wastes, combined with the fact that radionuclides are naturally occurring elements that cannot be neutralized or destroyed by treatment. All of the alternatives include off-site treatment and disposal of hazardous wastes in accordance with the RCRA regulations if any such wastes are encountered during implementation of the remedy.		
Short-Term Effectiveness			
Protection of the community during any remedial action	Lowest potential for impacts to the community: Transportation accident incidence:0.61 Carcinogenic risk to residents:3.3×10^{-6} Carbon dioxide emissions: 8,350 tons	Highest potential for impacts to the community: Transportation accident incidence:1.4 Carcinogenic risk to residents:2.1×10^{-5} Carbon dioxide emissions: 35,400 tons	Lower potential for impacts to the community: Transportation accident incidence:0.79 Carcinogenic risk to residents:2.0×10^{-5} Carbon dioxide emissions: 17,900 tons
		Excavation of RIM would create depressions in the waste where precipitation could accumulate increasing the potential for infiltration, leaching and creation of a plume of contamination in groundwater.	Excavation of RIM would create depressions in the waste where precipitation could accumulate increasing the potential for infiltration, leaching and creation of a plume of contamination in groundwater.
	This alternative poses the least potential for increased bird strikes to aviation operations at nearby Lambert-St. Louis International Airport.	This alternative poses potential for increased bird strikes to aviation operations at nearby Lambert-St. Louis International Airport.	This alternative poses greatest potential for increased bird strikes to aviation operations at nearby Lambert-St. Louis International Airport.
Protection of workers during remedial actions	Lowest potential for impacts to workers Industrial accident incidence – 4.7 Carcinogenic risk – 7.2×10^{-5} Worker dose (TEDE) – 50 mrem/yr	Greater potential impacts to workers from increased handling of RIM Industrial accident incidence – 7.6 Carcinogenic risk – 7.6×10^{-4} Worker dose (TEDE) – 260 mrem/yr	Greater potential impacts to workers due to increased handling of RIM Industrial accident incidence – 9.0 Carcinogenic risk – 7.4×10^{-4} Worker dose (TEDE) – 260 mrem/yr
Environmental impacts of any remedial action	No measurable long-term impacts to plants or animals are expected to occur from any of the alternatives. No wetlands are present on-site and no endangered species were identified in the site area. Regrading and/or excavating Area 2 would disturb the landfill surface and destroy the habitat that currently exists in this area, but this would be replaced by vegetative cover equivalent to an early stage field succession.		

Table 10: Comparative Analysis of Alternatives (continued)

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria (cont.)			
Short-Term Effectiveness (cont.)			
Time until RAOs are achieved	Implementation of institutional controls is included as part of all of the alternatives and would take approximately 1 year to implement. Potential threats would be addressed upon implementation of institutional controls. No potential threats would remain after implementation of any of the alternatives. Note: NTP for entries below is notice to proceed with RD.		
	RAOs would be achieved upon completion of construction 3 yrs after NTP w/ no fiscal constraint 5 yrs after NTP if fiscal constraint	RAOs would be achieved upon completion of construction 4 yrs after NTP w/ no fiscal constraint 29 yrs after NTP if fiscal constraint	RAOs would be achieved upon completion of construction 6 yrs after NTP w/ no fiscal constraint 13 yrs after NTP if fiscal constraint
Implementability			
Technical Feasibility	All of the alternatives are constructible.		
		There is uncertainty regarding the actual volumes of RIM that would need to be removed and the volume of daily cover that would be added resulting in uncertainty the actual disposal volume. The ability to remove deeper occurrences of RIM from Area 2 is a technical difficulty with this alternative and might result in schedule delays. The ability to locate a rail spur near the site or to construct a rail spur to and on the site is a technical difficulty that could limit the performance and schedule of this alternative. Reductions in the number of rail cars or the frequency of exchange of full and empty rail cars could impact the schedule for this alternative.	There is uncertainty regarding the actual volumes of RIM that would need to be removed and the volume of daily cover that would be added resulting in uncertainty the actual disposal volume. The ability to remove deeper occurrences of RIM from Area 2 is a technical difficulty with this alternative that might result in schedule delays. Construction and operation of a new engineered disposal cell is a common technology that has been demonstrated to be reliable. Only one possible location for a new disposal cell could be identified due to the Missouri river geomorphic floodplain. Subsurface conditions at this location are unknown and could affect technical feasibility and/or capacity of a new disposal cell.

Table 10: Comparative Analysis of Alternatives (continued)

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria (cont.)			
Implementability (cont.)			
Technical Feasibility (cont.)	Landfill cover systems have been used extensively and with proper inspection and maintenance have been demonstrated to be reliable. Stormwater controls and environmental monitoring are commonly used techniques that have been demonstrated to be reliable.	Excavation and offsite disposal is a common and reliable technology. Landfill cover systems have been used extensively and with proper inspection and maintenance have been demonstrated to be reliable. Stormwater controls and environmental monitoring are commonly used and demonstrated reliable techniques. Per the FAA, the reliability of most bird mitigation technologies are questionable.	Landfill cover systems have been used extensively and with proper inspection and maintenance have been demonstrated to be reliable. Stormwater controls and environmental monitoring are commonly used and demonstrated reliable techniques. Per the FAA, the reliability of most bird mitigation technologies are questionable.
	The only future actions anticipated to be required for all of the alternatives are ongoing inspection, monitoring, maintenance and, if needed, repair of the final landfill covers which should be easily implemented. All of the alternatives include a provision for a contingent landfill gas control system in the event the monitoring of subsurface occurrences of landfill gas or radon indicates a need for such a system.		
	Performance of all the alternatives can be monitored and potential risk of exposure in the event of failure of any of the alternatives would be low.		
Administrative Feasibility	Requires coordination and permitting with MSD for disposal of leachate and stormwater during construction. Requires access to Crossroad Property for investigation/removal of soil. Requires coordination with Earth City Flood Control district for design and operation of long-term stormwater management systems. May require preparation and approval of a traffic control plan for St. Charles Rock Road.	Implementation would require approval and verification of current acceptability for off-site disposal from EPA. Use of the Clean Harbors facility for disposal would require approval by the Rocky Mountain Low Level Radioactive Waste Compact. Construction of a rail spur would require leasing/acquisition of property located on the east side of St. Charles Rock Rd. and permission to construct a rail crossing over St. Charles Rock Rd.	Requires approval of City of St. Louis (unlikely based on prior discussions) to temporarily remove its Negative Easement and Restrictive Covenant against additional landfilling at the site and resultant impacts to airport safety. Requires coordination with and possible approval by the FAA for construction and operation a new disposal cell within 10,000 ft of the end of the westernmost runway at Lambert-St. Louis International Airport.

Table 10: Comparative Analysis of Alternatives (continued)

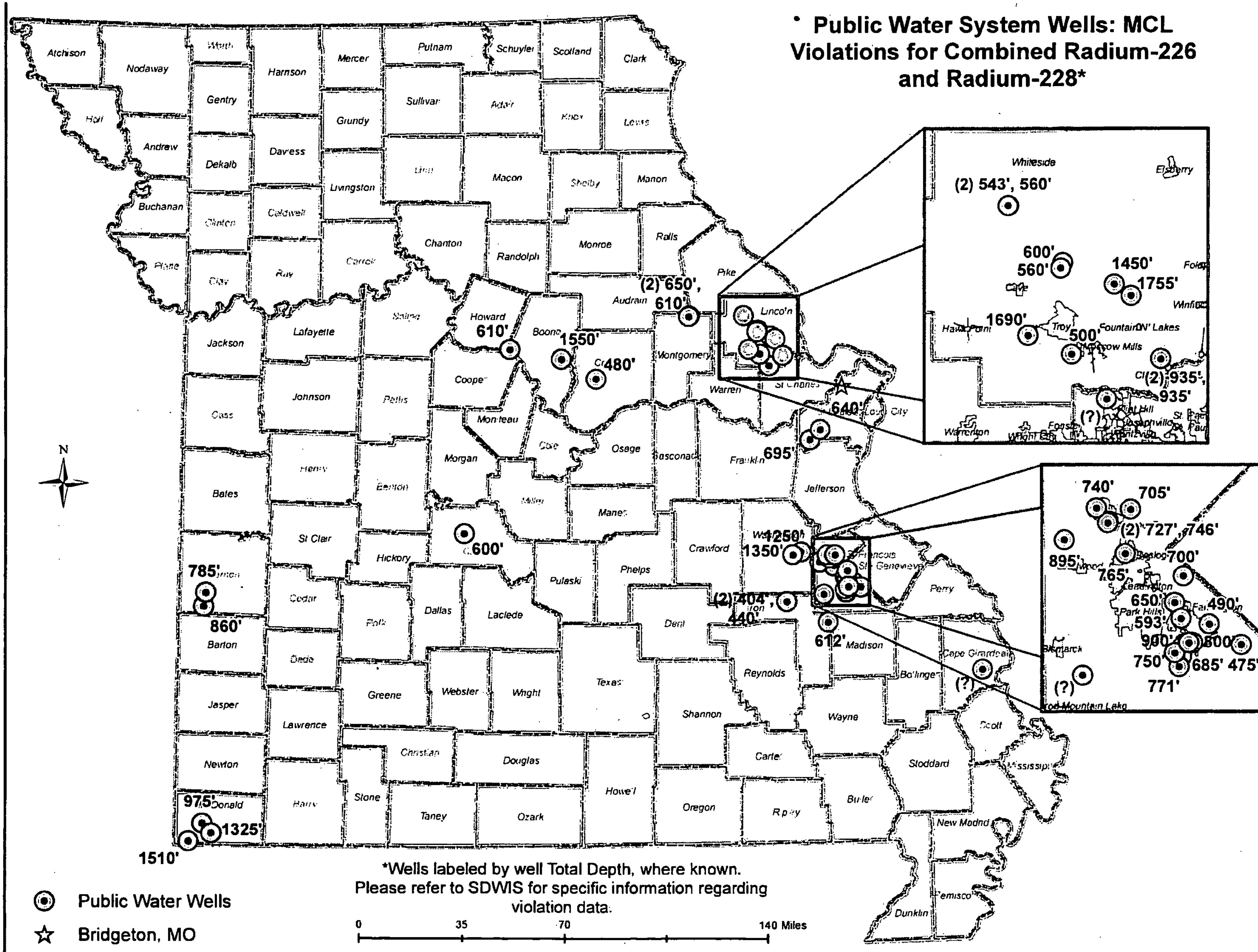
Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria (cont.)			
Implementability (cont.)			
Administrative Feasibility (cont.)		Requires coordination and permitting with MSD for disposal of leachate and stormwater during construction. Requires access to Crossroad Property for investigation/removal of soil. Requires coordination with Earth City Flood Control district for design and operation of long-term stormwater management systems. May require development and approval of a traffic control plan for St. Charles Rock Road.	Requires MDNR approval to construct haul roads over previously closed portions of the permitted landfill. Requires coordination and permitting with MSD for disposal of leachate and stormwater during construction. Requires access to Crossroad Property for investigation/removal of soil. Requires coordination with Earth City Flood Control district for design and operation of long-term stormwater management systems. May require preparation and approval of a traffic control plan for St. Charles Rock Road.
Availability of Services and Materials	Preliminary discussions with MSD indicate that it is willing and has sufficient capacity to accept leachate or stormwater that may be generated during construction. Alternatively, off-site disposal facilities are available to accept these materials if necessary	Only 2 or possibly 3 off-site disposal facilities are available that could accept the types of wastes in Areas 1 and 2. Preliminary discussions with MSD indicate that it is willing and has sufficient capacity to accept leachate or stormwater that may be generated during construction. Alternatively, off-site disposal facilities are available to accept these materials if necessary.	Preliminary discussions with MSD indicate that it is willing and has sufficient capacity to accept leachate or stormwater that may be generated during construction and leachate that may accumulate in the new on-site disposal cell. Alternatively, off-site disposal facilities are available to accept these materials if necessary.
	Adequate equipment, materials, and specialists necessary to implement this alternative are anticipated to be available.		

Table 10: Comparative Analysis of Alternatives (continued)

Evaluation Criteria	ROD-Selected Remedy	"Complete Rad Removal" with Off-site Disposal	"Complete Rad Removal" With On-site Disposal
Primary Balancing Criteria (cont.)			
Implementability (cont.)			
Availability of Services and Materials (cont.)	Technologies included as part of this alternative are generally available and sufficiently demonstrated. No prospective technologies are anticipated as part of this alternative.	Technologies included as part of this alternative are generally available and sufficiently demonstrated. No prospective technologies are anticipated as part of this alternative. Use of physical separation techniques could, if effective, reduce the overall cost of this alternative; however, the potential effectiveness, implementability, risks and cost of such techniques cannot be determined from available information. An on-site pilot-scale test would be necessary to make such determinations.	Technologies included as part of this alternative are generally available and sufficiently demonstrated. No prospective technologies are anticipated as part of this alternative.
Cost			
Capital cost	$41,400,000	$259,000,000 - $415,000,000	$117,000,000
O&M costs	$42,000 - $414,000	$40,000 - $412,000	$52,000 - $604,000
Total costs (30 years):			
No fiscal constraint			
Present worth	$43,000,000	$250,000,000 - $401,000,000	$112,000,000
Total (non-discounted)	$45,000,000	$262,000,000 - $419,000,000	$121,000,000
Fiscally constrained ($10M/yr):			
Present worth	$46,000,000	$211,000,000 – *Not Estimated*	$121,000,000
Total (non-discounted)	$49,000,000	$286,000,000 – *Not Estimated*	$141,000,000

The cost estimates summarized above and provided elsewhere in this SFS are feasibility level cost estimates; that is, they were developed to a level of accuracy such that the actual costs incurred to implement the alternatives should fall within a range bounded by 50% above and 30% below these estimates.

Public Water System Wells: MCL Violations for Combined Radium-226 and Radium-228*



*Wells labeled by well Total Depth, where known.
Please refer to SDWIS for specific information regarding violation data.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

FEB 5 2008

OFFICE OF
THE REGIONAL ADMINISTRATOR

The Honorable Christopher S. Bond
U.S. Senate
274 Senate Russell Office Building
Washington, D.C. 20510

Dear Senator Bond:

Thank you for your letter dated January 22, 2008, regarding the Westlake Landfill Superfund Site. I would like to assure you that we have reviewed existing information on floods and levee performance. Enclosed is a detailed technical memorandum that summarizes our findings and conclusions. Also enclosed; a presentation that my staff prepared, a page listing the resources that were used, and a map showing the West Lake Landfill/Earth City Industrial Park Levee System.

We analyzed the information in response to your question regarding the flood of 1993 and the breach of the Chesterfield levee upstream. The Chesterfield-Monarch Levee was considered by FEMA to be a 100-year levee. Early speculation was that the failure of the Chesterfield-Monarch type levees relieved the pressures on the urban levees that did not fail. To determine the real effects existing levees had on peak levels for the Mississippi and Missouri Rivers, the U.S. Army Corps of Engineers utilized its UNET model. Results of the modeling demonstrated that if all levees protecting agricultural land such as the Chesterfield-Monarch, 100-year levee were absent, the peak flood stage in the St. Louis area would have been reduced by 2.5 feet, but still 17 feet above flood stage and almost 4 feet higher than the previous maximum recorded from the 1973 flood event. Neither of these flood events overtopped or caused either the Earth City or Riverport Levee to fail. Another conclusion from the modeling indicated that even if the levees in place were constructed to contain all flows, peak stages at St. Louis would have been increased by 2.3 feet, still above flood stage, but well below the designated 500-year design level of the Earth City and Riverport levees. The independent model commissioned by the *St. Louis Post-Dispatch* concluded that the overtopping and eventual breaching of two levees downstream from St. Louis at Columbia and Harrisonville, Illinois, reduced peak stage at St. Louis by 1.6 feet and lends support to the UNET findings.

You also expressed concerns regarding the potential failure of the Earth City levee and the impacts of any contamination that might escape the West Lake landfill as a result. In response to your concerns, we conducted a thorough review and analysis of the levee system surrounding Earth City and the Westlake Landfill site location. In summary, the levee system surrounding the West Lake area is highly engineered to exceed the 500-year flood level and not like the Chesterfield levees that failed during the flood of 1993. The 500-year flood level would be 3-7 feet below the top of the levee. The West Lake landfill is almost 1.5 miles behind the levee, and the surface grade at the landfill is at least 25 feet above the historic floodplain. Also, the closest drinking water intake is approximately 8 miles from the site. If flood waters were to reach the landfill, and if the toe were unprotected (e.g., no bank stabilization in place, no bank armoring in place) then what would predictably be low-energy flood waters could begin to erode the bank and entrain landfill material into already contaminated and undrinkable flood water. However, the engineering of the cap at the West Lake landfill will provide some armoring of the toe and consideration will be given during cap design of other measures to prevent possible erosion of the slope.

We have thoroughly analyzed any potential flooding concerns as part of the Remedial Investigation and Feasibility Study process. That information, as well as other technical documents, will be placed in the administrative records for the site located at The Bridgeton Trails Branch of the St. Louis County Library, 3455 McKelvey Road, Bridgton, Missouri, and EPA's Regional Office in Kansas City, Kansas. As we proceed with the remedy selection process, we will review and utilize any additional technical information relevant to the decision making process.

Again, thank you for your letter. If you have any further questions, please feel free to contact me at (913) 551-7006 or your staff may call Rich Hood, Associate Regional Administrator for Media and Intergovernmental Relations, at 913-551-7906.

Sincerely,

John B. Askew
Regional Administrator

Enclosure(s)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

FEB 5 2008

MEMORANDUM

SUBJECT: Congressional Inquiry from Senator Christopher Bond - West Lake Landfill Remedy

FROM: Cecilia Tapia
Director, Superfund Division

TO: John B. Askew
Regional Administrator

At your request, we have reviewed the concerns outlined in the referenced letter and provide the following technical evaluation:

The Flood of 1993 Analysis

The Flood of 1993 in the Midwestern United States was a hydrometeorological event without precedent in modern times. In terms of precipitation amounts record river levels, flood duration, area of flooding and economic losses, it surpassed all previous floods in the United States. However, conditions that preceded the flood were a series of meteorological events that began in the summer of 1992.

July, September, and November 1992, were much wetter than normal in the Upper Mississippi River Basin. Winter precipitation was normal, but a wet spring followed. The period from April to June was the wettest observed in the upper basin in the last 99 years. As a result, soils were saturated, and many streams were already flowing above normal levels when summer rains began.

A persistent atmospheric pattern during the summer of 1993 caused excessive rainfall across much of the Upper Mississippi River Basin. Major flooding resulted primarily from a series of heavy rainfall events over the Upper Mississippi Basin from May to August 1993, which were unmatched in the historical records of the Central United States. During the June-August 1993 period, rainfall totals surpassed 12 inches across the eastern Dakotas, southern Minnesota, eastern Nebraska, and most of Wisconsin, Kansas, Iowa, Missouri, Illinois, and Indiana. Over 24 inches of rain fell on central and northeastern Kansas, northern and central Missouri, most of Iowa, southern Minnesota and southwestern Nebraska. Up to 38.4 inches of rain fell in east-central Iowa.

Wet antecedent soils, swollen river conditions and record rainfall resulted in the 1993 flood levels that ranged from below the 100-year up to the 500-year recurrence interval magnitude at many locations. For example, the 1993 flood stage at Louisiana, Missouri (about 100 miles above St. Louis, Missouri), is estimated to have a recurrence interval of nearly 500 years. At St. Louis, Missouri, the recurrence interval was about 175 years and at Chester, Illinois (about 70 miles below St. Louis, Missouri); the recurrence interval was about 100 years. At 45 U. S. Geological Survey (USGS) gauging stations, the flow levels exceeded the 100-year mark. However, the USGS has determined that the river reached record levels of river stage at St. Louis and elsewhere, although peak discharges were less than previously recorded.

Flood of 1993 Impacts

The Midwest Flood of 1993, one of the most costly flood events in U.S. history, flooded over 6.6 million acres in the 419 counties in the upper Mississippi Basin. Flood waters impacted numerous sectors (e.g., agriculture, residences and businesses, and transportation systems). One of the sectors that was immediately affected by flood waters and directly impacting the general population were public facilities.

The Flood of 1993 caused extensive damage to water and wastewater treatment plants and other public facilities. Water treatment plants are often located in floodplains to be near well fields or the surface water that supplies the system. In addition, water supply lines must cross flood plains to serve flood plain residents. The U.S. Environmental Protection Agency identified 200 municipal water systems impacted to some degree by the flood. The most prominent example is the Des Moines Water Works that serves the City of Des Moines, Iowa and adjoining communities. The plant was flooded and remained out of operation for 12 days, and water from it was not safe to drink for another seven days.

Wastewater treatment plants tend to be located in floodplains which are generally the lowest point in a community and offer the advantage of gravity flow. Furthermore, the effluent from these plants is discharged into major rivers or streams. The impact of flooding ranges from temporary plant shutdown and the discharge of raw sewage into the river during the flood to physical damage that result in extended plant shutdowns and continued discharges of raw sewage until the plant could be repaired. A total of 388 wastewater facilities were impacted by the flood.

Damages to utilities, including water and wastewater treatment facilities and storm-sewer systems, exceeded $85 million.

Under non-quantifiable damage costs, the EPA determined that 59 Superfund sites experienced flooding; however, impacts to the sites were minimal and corrective measures have been completed on sites requiring them. In addition, 73 solid waste treatment, storage and disposal sites were also flooded, large propane tanks were dislodged and floated downriver creating the potential for massive explosions. Beside large propane tanks, the state collected over 18,000 orphaned drums -- each with a potential hazardous or toxic substance -- and a large amount of household hazardous wastes whose disposal was necessitated by the flooding.

In response to concerns regarding the safety of private wells, a water well survey was established in coordination with the nine-flood states. The EPA performed flood water quality sampling around major metropolitan areas on the Missouri River. In some cases, drinking water standards were exceeded, but the majority of the readings posed no health risk. Results from sampling of treated drinking water revealed three locations where the Maximum Contaminant Level was exceeded although results from a single sample do not necessarily indicate a problem. The USGS and the National Oceanic and Atmospheric Administration have not found significant changes in water chemistry since the 1993 flood.

Flood Control

During the past 150 years or so, the Mississippi River Basin has undergone extensive development by mankind. Over the years structural flood protection both public and private has been built to protect the adjoining population and associated economic development.

The flood control system for the Upper Mississippi is made up of three components: flood control reservoirs, agricultural levees, and urban levees/floodwalls.

There are about 60 Federal flood control reservoirs above St. Louis. During the 1993 flood, the Federal flood control reservoir system stored over 17 million acre feet of flood water. None of this water reached St. Louis until after the crest in August 1993. These reservoirs are credited with reducing flood levels at St. Louis by about three feet.

There are about 1,600 levees above St. Louis. About 95% of these levees are agricultural levees (much like the Chesterfield Levee) providing relatively low levels of flood protection to millions of acres of cropland against floods of 10 to 50 years frequency. The remaining 5% are urban levees/floodwalls (mostly federal) built to a very high level to protect cities and towns against flood of this magnitude.

During the 1993 flood, all levees and flood walls built to urban design standards withstood the onslaught. No urban levee or floodwall was overtopped and the densely populated areas they protected were not flooded by the river. Examples of these levees are the Earth City Levee District and the Riverport Levee District.

The Earth City Levee District

The Earth City Levee District is a 1,891-acre District situated in St. Louis County, just five minutes west of Lambert-St. Louis International Airport and less than a mile west of the busiest major highway intersection in Missouri. Its strategic location is a major reason for the District's development success. The District is a political subdivision of Missouri.

Since 1972, business and economic growth in the St. Louis region have greatly benefited from the development of attractive and very functional industrial, office and retail properties in the District. Location is one of the important keys to the District's development success.

At the end of 2005, the District contained 450 businesses, employing 22,800 with an annual payroll exceeding $1 billion. The almost 240 properties in the District have over 18 million square feet of space with a market value of $1.2 billion.

The District is protected from flooding by a 500-year levee and supporting flood control system managed around the clock by a qualified management firm and assisted by professional engineering firms. The U.S. Army Corps of Engineers conducts yearly inspections. The Federal Emergency Management Agency (FEMA) maps designate the District as being protected by a 500-year flood levee. As a result, the National Flood Insurance Program regulations do not require the purchase of flood insurance.

The District's flood control system is considered by many in the field to be one of the finest in the entire country. Supporting this claim is the fact that since 1972, four major floods have tested the District's flood control system – including the record 1993 flood – with minimal damage that was quickly repaired. (*See Attachment A for responses to similar concerns of Dr. Robert E. Criss, of the Missouri Coalition of the Environment*).

Major Flood Events

Four major floods have occurred since the 2.6-mile, 500-year earthen levee was completed in September 1972. A major flood is when the water level in the Missouri River is at a minimum of 10 feet above flood stage for at least one week.

During the four major floods, the District's flood control system sustained minimal damage that was quickly repaired.

Spring 1973 and fall of 1986: Crest elevations were under the 50-year flood level. The 1973 flood stage lasted about 75 days. This is significant as at this time, the 500-year levee was only six months old. The 1986 flood was higher than the 1973 flood but of a relatively short duration.

August 1993: During this record level flood, the Missouri River crested at 14.6 feet above flood stage on August 2, and remained above flood stage for about 110 days. It has been estimated that at its August 2 crest, the Missouri River was at a 200-year flood level. The levee and the other components of the District's flood control system successfully resisted the flood.

May 1995: The Missouri River crested at 11.7 feet above flood stage but the flood duration was relatively short.

In addition to the four major floods, the Missouri River has been over flood stage numerous times --usually at a level less than five feet over flood stage. These are normal events.

Immediately to the south of the Earth City Levee District is the Riverport Levee District.

The Riverport Levee District

The Riverport Project is located in the City of Maryland Heights, St. Louis County, Missouri, approximately 17 miles northwest of the City of St. Louis. The Urban Levee, designed for the 500-year Missouri River flood event, extends from about river mile 30.4 to river mile 29.6 above the Mississippi River on the right descending bank.

The project consists of a 1.7 mile long levee that protects the Riverport area and a portion of Interstate Highway I-70 from Missouri River floods.

Riverport Business Park is a 525-acre master-planned business and entertainment community that was carved out of the Missouri River floodplain through the construction of the Riverport Levee in 1980.

The Riverport Levee system is similar to the Earth City Levee District. It is made up of 1.5 miles of earthen levee, under seepage protection berms, a relief well system comprised of 76 wells, a three-stage pump station supplied by primary and generator backup power, and the associated stormwater retention channels within the development. Of the 1.5 miles of levee, only 0.4 mile is in direct contact with the Missouri River, the remainder is a flanking levee that runs between Riverport and the adjacent Howard Bend Levee District (to the south around Harrah's entertainment complex). Since the formation of the District, the system has been reviewed by the Army Corps of Engineers on a yearly basis.

Unlike some levee systems that were modified farm levees, the Riverport Levee was designed and constructed by Sverdrup, a world renowned Civil Engineering and Construction Company (subsequently acquired by Jacobs Engineering in 2000) to protect the Riverport Business Park. The Riverport Levee was designed and constructed to an elevation exceeding the 500-year flood elevation by 3 feet to protect the significant investment associated with a Class A Business Park.

Levees

Recalling the Great Flood of 1993, the Missouri River rose to breach levees and flood all but a few spots along its reach in central and eastern Missouri--the primary exceptions being the Riverport and Earth City business parks in suburban St. Louis County. One of the most dramatic levee failures was the Monarch levee, which provided nominal 100-year flood protection for an area on the Missouri River called Chesterfield Valley, located in the city of Chesterfield in west St. Louis County.

The Chesterfield- Monarch Levee was considered by FEMA to be a 100-year levee, meaning that the valley it protected had roughly a 1 percent chance of flooding in any given year. By comparison, a community protected by a 500-year levee has about a 0.2 percent chance of flooding in a given year.

On July 30, an area of some 4,700 acres occupied by office and industrial parks, a large general aviation airport owned by St. Louis County government and a five-mile stretch of Interstate 64 disappeared under 10 feet of water. Because the levee break was in the upstream portion of the valley contained by the Monarch Levee, the floodwaters were very slow to drain out of that basin even as the level of the river dropped. Flood damage was estimated at more than $320 million in 2006 dollars. Though no precise determination was possible because of limitations of historic records and continual changes in run-off characteristics throughout the river basins, the U.S. Army Corps of Engineers estimated that the 1993 flood was of lower frequency than a 100-year flood but not nearly as extreme as a 500-year flood--perhaps a 250-year flood.

The recovery of Chesterfield Valley since 1993 is a dramatic and inspiring story. Nearly a half billion dollars in public and private funds have been invested, with nearly 20 percent of that directed toward providing improved access and a 500-year flood protection system--a levee rated to withstand a flood level with a probability of occurring once in 500 years, or 0.2 percent probability in any one year. Business is booming, and the city of Chesterfield, along with the private interests that took the risk and invested in the recovery, are reaping handsome fiscal and economic rewards.

Early speculation was that the failure of the Chesterfield-Monarch type levees relieved the pressures on the urban type levees that did not fail. However, to ascertain the actual effect existing levees had on peak 1993 Mississippi and Missouri river flood stages', the U.S. Army Corps of Engineers utilized their newly developed modeling program, UNET, which analyzed unsteady state river flow conditions. **The analysis used flow data from 1993, 1986, and 1973 floods. The analysis suggested that if all levees (other than urban levees)**

were absent, the peak stage at St. Louis in 1993 would have been reduced by 2.5 feet, but still more than 17 feet above flood-stage and almost 4 feet higher than the previous known maximum level recorded during the 1973 event.

Flood Water Dynamics

Upland erosion and sedimentation in downstream areas are major causes of reduced water quality. Significant floodplain erosion and deposition occurred during the 1993 flood, principally on floodplain agricultural lands along the Missouri River. Preliminary analyses of aerial, satellite imagery, and historic Missouri River floodplain maps reveal that more than 90 percent of the areas affected by significant erosion and deposition are associated with breached levees situated in active, high energy floodplain zones. Review of the history of levee failures in this area shows levees have been breached repeatedly at sites of natural river cutoffs or chutes in the past three decades.

Through the effects of soil erosion, any unprotected soil surface can be the source of suspended solids. Total suspended solids (TSS) may carry contaminants, such as nutrients, organic matter, pesticides, and heavy metals. In most rivers TSS is primarily composed of small mineral particles. TSS is often referred to as 'turbidity'. TSS, especially when the particles are small (< 63 micrometers), carry many substances that are harmful or toxic.

The analysis of TSS loads provides useful information about the physical behavior of rivers. Because total suspended solids concentration is partly a function of discharge, TSS loads increases as discharge increases. In many rivers, the amount of sediment (solids) transported (the load) can vary over three orders of magnitude during the year.

Comparison of the effects of the 1993 floods on the upper Mississippi and Missouri rivers shows that rivers in broadly similar physiographic regions may respond very differently to floods. The annual discharges of the upper Mississippi River are generally comparable to those of the Missouri River, but sediment yields of the Missouri average more than five times those of the Upper Mississippi. Average slope of the lower Missouri River floodplain (upstream of St. Louis) is about twice that of the middle Mississippi River floodplain (downstream from the St. Louis). Levee breaches along the lower Missouri commonly resulted in high-velocity flows across its relatively narrow and relatively steep (high gradient) floodplain.

Transport of sediment by fluid flow involves two fundamental steps: (1) erosion and entrainment of sediment, and (2) subsequent, sustained down-current or downstream movement of sediment. The term entrainment refers to the processes involved in lifting resting particles from the bed or otherwise putting them in motion. Once particles are lifted from the sediment into the overlying water, the rate at which they fall back to the bed – settling velocity – is an important factor in determining how far the particles travel downstream before they again come to rest or are deposited.

As previously noted, the average slope of the lower Missouri River floodplain (upstream of St. Louis) is twice that of the middle Mississippi River floodplain (down stream from St. Louis).. As slope increases, the component of gravitational force parallel to the slope also increases. Thus, velocity is directly proportional to slope and increase as slope increases. Therefore, any suspended solids entrained in high-velocity flood waters in the Missouri River (above St. Louis) would stay in suspension until both slope and velocity decrease which would most likely be when flood waters enter the lower Mississippi River floodplain (downstream of St. Louis).

Conclusion

Based on my analysis of the data, presented above, I submit the following conclusions:

1) The Flood of 1993 was the culmination of a series of unprecedented meteorological events creating a flood of previously unseen magnitude in extent, damage and costs. The recurrence interval of the flood ranged from less than 100 years at many locations to near 500 years on segments of the Mississippi and Missouri Rivers.

2) Services critical to human health were impacted by the flood waters. Hundreds of public drinking water suppliers lost their wells and their ability to supply their customers with clean, safe drinking water. Many locations issued boil orders before consuming any water from affected water supplies. Hundreds of waste water facilities were inundated with flood waters, leading to service disruption or total shutdown, resulting in ten of thousands of gallons of raw, untreated sewage being discharged into already contaminated flood waters. The Safe Drinking Water Act requires public water systems to test the water for contaminants before allowing the public to resume consumption.

3) Fifty-nine Superfund sites (West Lake Landfill was not one of the 59), managed by the U.S. Environmental Protection Agency also experienced flooding; fortunately impacts were minimal and correctives measures were implemented at sites requiring them. Flood damage at other unprotected locations proved more problematic, as the 18,000 orphaned drums containing unknown substances floated along with rising flood waters. Other businesses located in the flood plains and eventually inundated by the flood waters included gas stations, automotive garages, agricultural businesses, manufacturing companies, and solid waste disposal facilities. Each of these businesses used, manufactured, stored or transported various forms of hazardous and non-hazardous pollutants to the river.
3) Areas that fared the best were protected by state-of-the-industry engineered 500-year flood levees/floodwalls, specifically, the Earth City Levee District and

the Riverfront Levee District. Both of these Districts have been designated by FEMA as 500-year levees providing a higher level of protection (about a 0.2 percent chance of flooding in a given year) than protection from a 100-year levee, meaning that the valley it protected had roughly a 1 percent chance of flooding in any given year. The 500-year levee protection does not go without its rewards as these Districts are home to businesses ranging from the Fortune 500 to small independent companies and employing thousands of local residents. All were protected from the 500-year flood with state-of-the-industry designed and constructed flood control systems.

4) Unrelated to the Earth City Levee District, but able to take advantage of the levee, by coincidence of location, is Operable Unit 1 (OU1) of the West Lake Landfill. The toe of the most northern part of OU1 (See Attachment B) is approximately 1.5 miles from the bank of the Missouri River. Between the toe of OU1 and the river are the 500-year Earth City Levee and the Earth City flood control retention pond. Both these components of the Earth City Levee District system provide the 500-year flood protection to the landfill as it does to the businesses located in the confines of the district proper.

The construction standard for a 500-year levee requires a minimum of three feet of freeboard above the 500-year flood level. For example, on the I-70 end of the 2.6 mile levee the 500-year flood level is at an elevation of 459.03 feet, and the top of the levee is 462.03 feet. At the northern end of the levee the 500-year level is 452.15 feet and the top of the levee is 459.34 feet. The flood waters of 1993 were significantly below the top of the levee.

However, there are other variables that could become a factor in controlling flood waters. As alluded to earlier, one of the successful methods of controlling the 1993 flood waters was the use of the reservoirs up stream. As stated, the Federal flood control reservoirs system stored over 17 million acre feet of flood water. None of this water reached St. Louis until after the crest in August 1993. These reservoirs are credited with reducing flood levels at St. Louis by about three feet. Even if the reservoirs could only hold half the amount they did, the extra water downstream would still not have breached the 500-year levees.

5) If flood waters were to reach the toe of OU1, and if the toe were unprotected (e.g., no bank stabilization in place, no bank armoring in place) then what would predictably be low energy flood waters could begin to erode the bank and entrain landfill material into already contaminated and undrinkable flood water. However, the engineering of the cap at the West Lake Landfill will consider armoring of some type to prevent possible erosion of the slope.

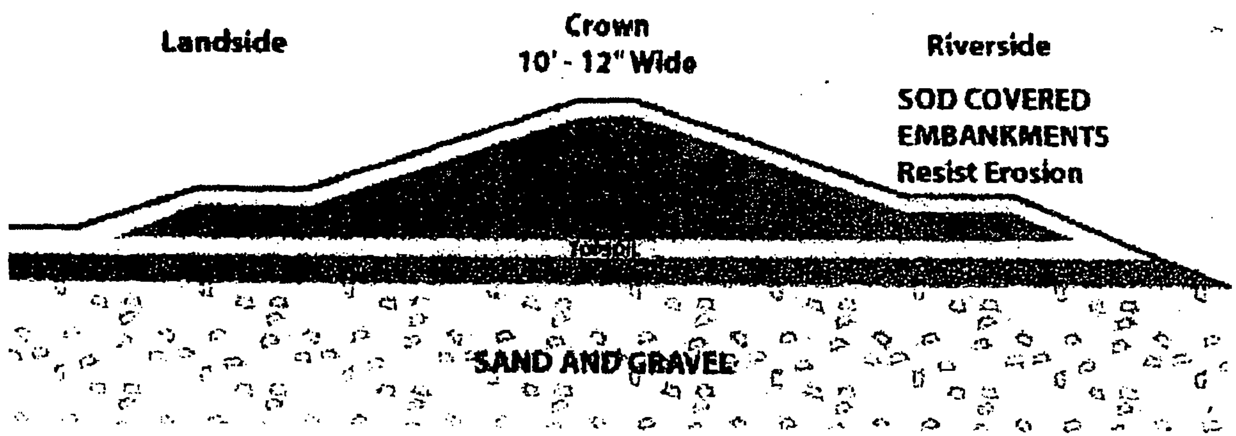
Attachment(s)

WEST LAKE LANDFILL BRIEFING
February 2008

"The West Lake Landfill is located in a geomorphic floodplain. A floodplain is a place where a river floods commonly. Levees fail. Several levees in the St. Louis County have failed in the last fifteen years. It's preposterous to claim that levees don't fail. These risks are chronically underestimated." - *Robert E. Criss, PhD, Washington University's Department of Earth and Planetary Sciences.*

"There are about 60 Federal flood control reservoirs above St. Louis and about 1,600 levees. About 95% of these levees are agricultural levees (mostly are privately owned) providing relatively low levels of flood protection to millions of acres of cropland against floods of 10 to 15 years frequency. The remaining 5% are urban levees/floodwalls (mostly Federal) built to a very high level to protect cities and towns against floods of great magnitude. During the 1993 flood, all levees/floodwalls built to urban design standards withstood the onslaught. No urban levee or floodwall was overtopped . . .and flooded by the River." – *Protecting Society From Flood Damage, A Case Study from the 1993 Upper Mississippi River Flood, Lovelace, James T., Strauser, Claude N. St. Louis District, USACOE, 2008.*

EARTH CITY LEVEE SYSTEM*



Levee: The District is protected by 3 reaches of levee

The 2.6 mile 500-year-rated earthen levee was constructed in 1972 to USACOE standards. The levee has a sand core. A typical cross-section of the levee has a 10-foot wide top with 1-foot vertically to 3-foot horizontally sloped sides. The riverside face of the levee has a 5-foot thick soil cover intended to protect the levee from seepage penetration during a major flood event.

* http://www.earthcityld.com/index.aspx

EARTH CITY LEVEE SYSTEM

Four major floods have occurred since the levee system was completed in 1972.

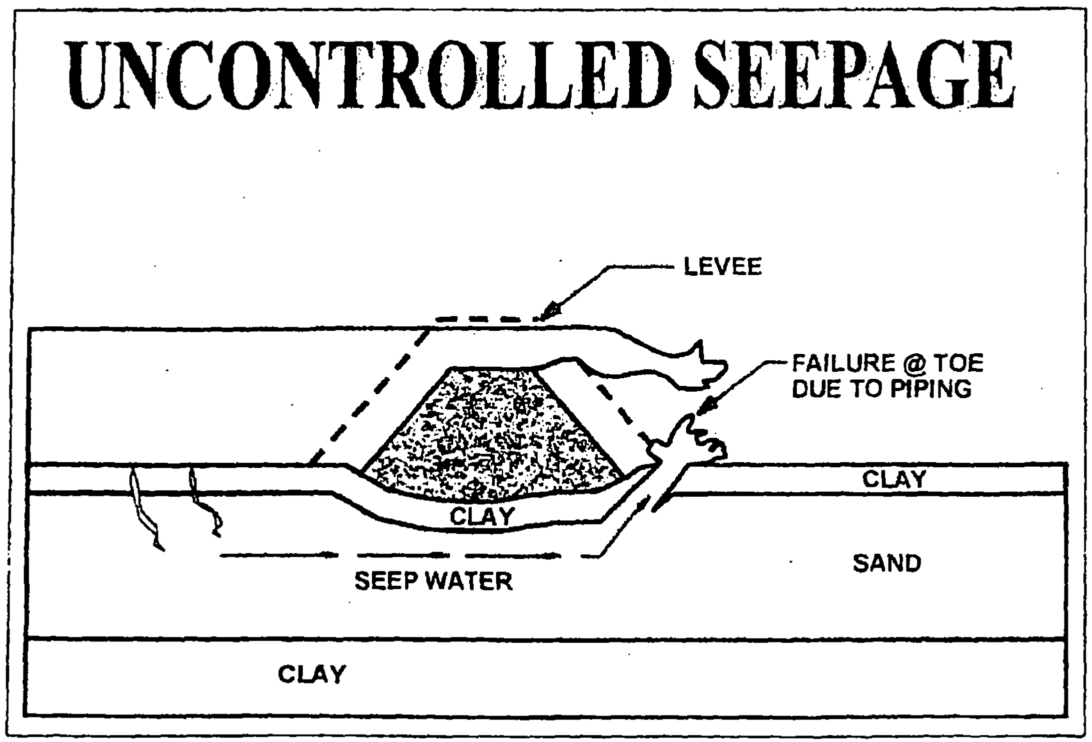
Spring 1973 and Fall 1986: Crest elevations were under the 50-year flood level. The 1973 flood stage lasted 75 days, This is significant, as the levee was only six months old. The 1986 flood was higher than the 1973 level but of a relatively short duration.

August 1993: During this record level flood, the Missouri River crested at 14.6 feet above flood stage on August 2, and remained above flood stage for about 110 days. It has been estimated that at its August 2 crest, the Missouri was at a 200-year flood level.

May 1995: The Missouri River crested at 11.7 feet above flood stage, but the flood duration was relatively short.

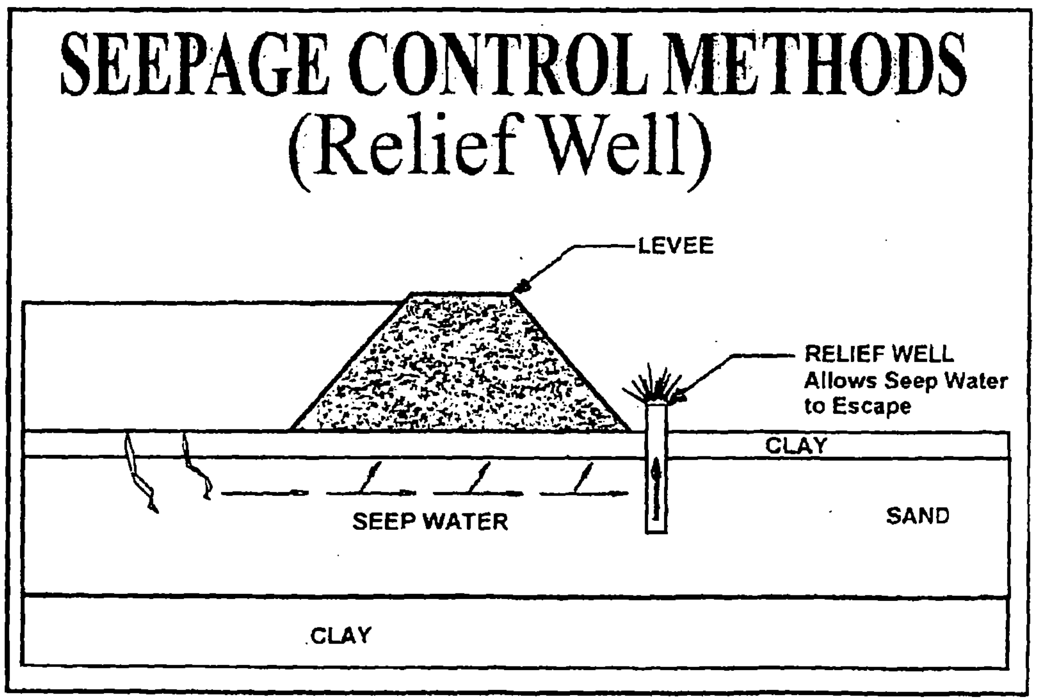
Since the 500-year levee was completed in September 1972, in addition to the four major floods, the Missouri River has been over flood stage numerous times – mostly at a level less than 5 feet over flood stage.

"Levees can fail either by overtopping or by piping through or underneath the structure. That is, the river can form blow-holes [known as "blew holes" or scour holes]. Water can pipe through or underneath the levee. The water bubbles up under the levee." - *Robert E. Criss, Ph.D, Washington University's Department of Earth and Planetary Sciences.*



EARTH CITY LEVEE SYSTEM

The District has a total of 83 relief wells of which 67 are located along the landside toe of the levee. These 67 wells were installed between 1988 and 1992. The wells are 60 deep gravity flow wells with a designed discharge capacity of 780 gallons per minute. Without the relief wells, the soil moved by the underground water flow could create voids under the levee. The levee could collapse into the void.



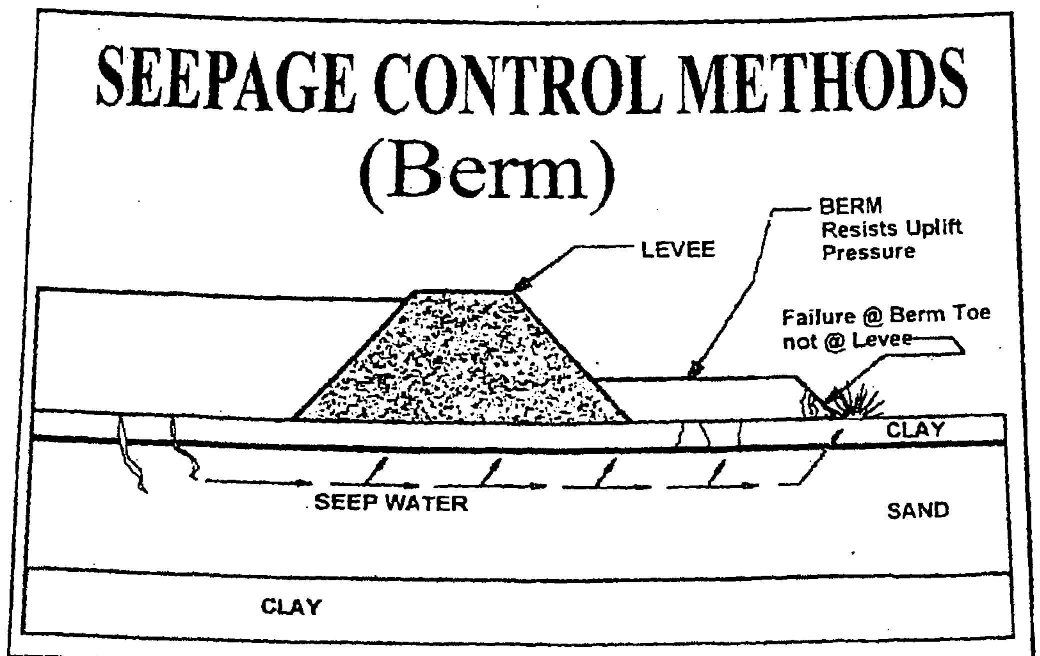
"In the event of a failure, you have high energy, high velocity water that catastrophically scours the ground, especially unconsolidated material which it scatters for miles." - *Robert E. Criss, PhD, Washington University's Department of Earth and Planetary Sciences.*

It has been shown that the Earth City Levee and the other components of the Districts flood control system successfully resisted the 500-year flood of 1993. With a 0.2% recurrence interval within any given year for 500-year flood it is anticipated that the Earth City Levee System will remain protective. However, in the event the levee is breached and the 500-year flood waters were to encroach on the business park it would be expected to result in no more than about two feet of water at the northwestern toe of the landfill. Thus, only the lower two feet of the toe of the landfill would be impacted.

During the Remedial Design phase of the project different materials and technologies (e.g., bank stabilization systems, levee armoring systems) will be evaluated for their protective properties against high velocity water damage.

EARTH CITY LEVEE SYSTEM

A landside under seepage protection berm extends the entire length of the 2.6 mile levee up to a distance for 625 feet east of the toe of the levee. The purpose of the berm is to contain excess groundwater pressure. The berm consists of a layer of heavy clay that counteracts the groundwater pressure under the levee.



EARTH CITY LEVEE SYSTEM (additional controls)

Interior Storm Water Drainage System

The interior storm water drainage system for 82% of the District's 1,891 acres is handled through an interconnecting system of ditches, channels and lakes, all of which ultimately gravity flow to the District's pump station and discharge structure.

The storm water in the Rock Industrial Park and Northwest Industrial Park areas of the District contain storm water within their areas in retention ponds. The sole method of discharge from the ponds is percolation and evaporation

Pump Station

The District's pump station and discharge structure, a vital component of the District's flood control system, penetrates the 2.6 mile levee about 500 feet south of St. Charles Rock Road. As mentioned earlier, 82% of the District's storm water is tributary to the pump station and discharge structure.

The pump station was completed in 1972 and rests on top of the discharge structure. The reinforced concrete pump station contains three, 150 hp electric pumps each capable of discharging 22,500 gpm -- even during a major flood event. A diesel generator operates the pumps in the event of a power failure.

EARTH CITY LEVEE SYSTEM (additional controls)

Maintenance

The District has developed a comprehensive and ongoing maintenance program whereby the entire levee system, relief wells, pump station and other mechanical and electrical systems are inspected at least annually by qualified independent contractors. The USACOE (Corps) inspect the levee and pump station normally on an annual basis.

The District's levee and the pump station have qualified for participation in the Corp's rehabilitation assistance program for flood control projects (e.g. Public Law 84-99). As a result of such participation, the Corps will pay 80% of the construction costs incurred in connection with rehabilitation of the levee or pump station resulting from flooding. Costs such as dirt are not covered by the Corps' assistance program.

Earth City Levee District

<u>District Development</u>

Development within the District is commercial in nature consisting primarily of industrial and distribution style buildings, service centers, office buildings, hotels along with some service related retail and specialty facilities for a total of 450 businesses. Some of the companies are:

ADVO, Inc. - direct mail & advertising
Almo Distributing- EHP Direct - major appliance & consumer electronics distributor
Best Buy Service/DDC - Warehouse consumer electronics distribution & repair
Candlewood Suites Hotel - extended stay hotel
Central Mine Equipment Company - drilling equipment & tooling manufacturer
Cingular Wireless - cell site maintenance warehouse
DHL Express - air express & ground delivery service
Federal Aviation Administration - maintain NAS electrical equipment
FedEx Express - package delivery
Home Depot Supply - maintenance products
Northrop Grumman Corp. - electronic systems-marketing
St. Louis Rams - professional football
United Parcel Services of America, Inc. - small package delivery